

# **EXHIBIT ‘D’**



**sunvent**

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**SYLRO**

July 18, 2011

ATTN: Mr. Steve Geci

Geci and Associates Engineers, Inc.

2950 N. 12<sup>th</sup> Ave.

Pensacola, FL 32503

**RE: URGENT REQUEST-FLOOD VENTS INCORRECT CALCULATIONS/CRAWL SPACE DOORS/FEMA  
Technical Bulletin 1 – August 2008**

Dear Mr. Geci:

I have drafted this letter to express my concerns regarding the engineering calculations that were used to calculate free air flow of certain Flood Vents by a company known as Crawl Space Doors. Our research has led us to conclude that Crawl Space Doors as well as the engineers that have certified the Flood Vents manufactured by Crawl Space Doors have been incorrectly calculating free air flow for vents used to meet FEMA requirements in accordance with FEMA Technical Bulletin 1, August 08. A more detailed explanation of our concerns over the free air flow calculations as well as some concerns over mechanical issues regarding the manner in which the Crawl Space Doors vents close without regard to requirements of automatic entry and exit of floodwater follows.

We have reviewed various engineering certificates relating to the Crawl Space Door Systems Inc. Flood Vent product line provided by Crawl Space Doors (said certificates certify compliance with FEMA TB1-August 2008). Attached please find a copy of a certificate that you have issued, and is published on their website, stating that you have obtained the Net Free Air opening size for each model from the manufacturer and then used this information to complete a formula provided by FEMA to determine the Engineered Square Footage for each vent. We have concluded that the Net – Free Air (sq. Inches) calculations were not prepared correctly. We believe that you have not verified the net free air calculations provided to you by the manufacturer as they are computed incorrectly. The calculations for computing Free Area for Louvers and Vents are set forth by AMCA (Air Movement and Control Association). These calculations are industry standard guidelines which have been universally accepted. We have confirmed these calculations and guidelines with engineers that we have contacted regarding this issue. With unanimity the professionals have reviewed the calculations and specifications as set forth in the above referenced Crawl Space Doors Engineering Certificates and they cannot replicate the claims of Net Free Air as set forth herein.

The Air Movement and Control Association International, Inc. is a not-for-profit international association of the world's manufacturers of related air system equipment - primarily, but not limited to: fans, louvers, dampers, air curtains, airflow measurement stations, acoustic attenuators, and other air system components for the industrial, commercial and residential markets.

AMCA International, backed by over 80 years of standards development, is the world's leading authority in the development of the science and art of engineering as it relates to air movement and air control devices. AMCA International publishes and distributes standards, references, and application manuals for specifiers, engineers, and others with an interest in air systems to use in the selection, evaluation, and troubleshooting of air system components. Many of AMCA International's standards are accepted as American National Standards.

The AMCA's standards for computing free area can be reviewed at:  
[AMCA.org/assets/crpdocument/amca\\_511.pdf](http://AMCA.org/assets/crpdocument/amca_511.pdf)  
 Pages 24 and 25, however the calculation is set forth as follows:

$$\text{Free Area} = L [A + B + (N \times C)]$$

**Horizontal blade louvers**

*A = Minimum distance between the head and top blade.\**

**Note:** *Where the top blade dimension C is less than A, use the value for C.*

*B = Minimum distance between the sill and bottom blade.\**

*C = Minimum distance between adjacent blades. Note that in louver Type 2, C may not be equal to C1.\**

*N = Number of C openings in the louver.*

*L = Minimum distance between louver jambs.*

*W = Actual louver width.*

*H = Actual louver height.*

*\* The A, B & C spaces shall be measured within one inch from each jamb and averaged.*

Crawl Space Doors and the engineers certifying said vents have calculated the Net Free Air by measuring the size of each louver and deducting the size of all obstructions to determine the Net – Free Air opening size, as stated in their certificates and literature. This is simply improper and would lead an end user to underestimate the number of vents required. The angle of the blade and the space between each blade is a significant determining factor for Net Free Air in any louver. (See “C” in formula above-this figure is the MINIMUM distance between adjacent blades-not the thickness of the blade multiplied by its width).

By way of example, if the Crawl Space Doors formula was in fact correct, then, if one had a louver that was 16”W x 8”H with a 1” frame around the perimeter leaving you with 14”W x 6”H unobstructed opening and that louver had a single blade that was .100” thick set at the top of the unit (allowing NO air flow above the blade and only ½” space below the bottom of the louver blade and the bottom of the louver itself) using Crawl Space Doors calculations the Net – Free Air would be:  $(14 \times 6) - (.1 \times 14) = 82.6$  square inches of free air. The actual free air of this louver is  $.5 \times 14 = 7$  square inches of free air. As you can see, in reality, only ½” of air can flow thru this louver under the bottom blade, and therefore, the formula that Crawl Space Doors used would be incorrect using this very extreme example to illustrate my point.

By way of further example, if one had another louver that was 16”W x 8”H with a 1” frame around the perimeter leaving a 14”W x 6”H unobstructed opening and that louver had a single blade that was .100” thick set at the top of the unit (same as the last example) but leaving a 2” opening space between the bottom of the unit and the bottom blade using Crawl Space Doors calculations the Net-Free Air would be exactly the same as in the example above  $(14 \times 6) - (.1 \times$

14) = 82.6 square inches of free air. The actual free air of this louver is  $2.0 \times 14 = 28$  square inches of free air. As you can see, in reality, 2" of air flow will flow thru this louver and therefore, the formula that Crawl Space Doors used would be incorrect again.

By using the incorrect formula applied by Crawl Space Doors' flood vents this would result in incorrect results as well, where the fewer blades in a vent, even at the steepest angle possible would yield more free air flow than the same number of blades at a shallower angle.

Our engineers have calculated the true free-air for Crawl Space Doors model D0816. The actual Free-Air computed as follows according to AMCA standards is:  
 $14'' \text{ wide vent less } 1'' \text{ center mullion support} \times (0'' \text{ space between top of vent and top blade} + .625'' \text{ space between bottom of vent and bottom blade} + (3 \text{ number of openings between blades} \times .85'' \text{ space between blades})) = 41.34 \text{ square inches of Free-Air.}$  This is in direct contrast with the 95 square inches of Net-Free air as set forth in the Crawl Space Doors literature as well as their website and stamped and sealed engineering certificates and marketing materials.

If the net free air is incorrect, then of course, the Engineered Opening figures will also be incorrect.

As stated above, in addition to our concerns about the incorrect free air flow calculations, Crawl Space Doors provides a "blank off" panel made of paperboard for use by customers during winter months on the smaller vents they manufacture and a plastic cover to manually attach to the vent on the larger flood vents. As a matter of fact, their website shows a slideshow of just how to install this blank off in the flood vent specifically. This blank off panel will bring the net free air flow to zero while this paperboard or plastic panel is in place and the engineered openings to zero as well. FEMA requires the "automatic entry and exit of floodwaters" as well as does not permit any device that must be manually removed in a flood vent, also clearly stated in FEMA Technical Bulletin 1, August 2008. In cases where it may be possible for the flood waters to rise with such force as to "blow out" the paperboard this usage is still strictly prohibited by FEMA in the Technical Bulletin 1- August 08. Just by providing the paperboard and covers with each flood vent would invite the consumer to use them. This paperboard and other devices used to cover Crawl Space Doors Flood Vents have not been taken into account as well in the preparation of free air calculations by the manufacturer or the engineers certifying the vents as with these products in place on the Flood Vents the actual net free air is zero and the engineered opening is zero as well.

Our general concern is that the information provided by Crawl Space Doors to consumers, contractors, engineers and architects as well as the NFIP and FEMA is incorrect. This information will result in a significant under-installation of required flood vents for any given space which may lead to significant damage to structures, affecting the property of consumers that have relied on this information. The free air flow calculations are the primary determining factor as to the size and number of vents to install in a structure. The liability of NFIP is greatly increased by any significant incorrect information provided by any manufacturer. This liability may be of catastrophic consequence to the owners of the properties and the NFIP using incorrectly calculated louvers as "engineered" openings; as by certifying the engineered openings using the incorrect free-air the gross errors in these calculations are multiplied by using the FEMA provided formula for calculating engineered openings. This may cause NFIP to potentially suffer additional catastrophic losses and liabilities and may even lead to loss of life.

FEMA has also been notified in regards to the miscalculations and are considering a possible recall or a possible replacement of existing Crawl Space Door Systems Inc. Flood Vents installed in structures. It is our hope that this information, when acted upon by the proper authority, may avert potential loss posed by the use, both past, present and future, by consumers unaware that the product that they have installed in their structures are violating FEMA and NFIP rules and regulations stated in FEMA Technical Bulletin 1-08.

I may be reached by email: [lori@sunventindustries.com](mailto:lori@sunventindustries.com) or telephone 603-595-4556 if I may be of any assistance or you have any additional questions.

Sincerely,

A handwritten signature in black ink, appearing to read "Lori Joseph". The signature is fluid and cursive, with the first name "Lori" and last name "Joseph" clearly distinguishable.

LORI JOSEPH

President

Sunvent Industries

div. of Sylro Sales Corp.



# Certification of Engineered Flood Openings (TB 1 – August 2008)

I do hereby certify that the CRAWLSPACE FEMA FLOOD LOUVER, Patent No. US D583,042 S, dated December 16, 2008 and owned by Crawl Space Door Systems, Inc. properly installed and sized in accordance with Federal Emergency Management Agency's National Flood Program regulations (44 CFR 60.3(c)(5)) and National Flood Insurance Program, Technical Bulletin (TB) 1-August 2008 is designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for entry and exit of floodwater during floods up to and including the base (100-year) flood.

I also do hereby certify that I calculated the Non-Engineered, and Engineered Opening size for each model and size of the Flood Louvers. The results of the calculations are recorded in the table below. The Engineered size opening calculation was performed by using the formula in FEMA Technical Bulletin 1 / August 2008, Openings in Foundation Walls for Buildings Located in Special Flood Hazard Areas in accordance with the National Flood Insurance Program and ASCE/SEI 24-05, Flood Resistance Design and Construction. The Net-Free Air opening size for each model was provided by the manufacturer. I used the formula ( $A^o = 0.033 [1/C] R A_e$ ) in TB 1 – Aug 2008 to determine the Engineered opening size for each model. I used the following assumptions:  $A^o$  = total net area of openings required ( $\text{in}^2$ ); 0.033 = coefficient corresponding to a factor of safety of 5.0 ( $\text{in}^2 \cdot \text{hr}/\text{ft}^3$ );  $c = 0.40$  opening coefficient (ASCE 24 Table 2-2 "rectangular, long axis horizontal, short axis vertical unobstructed during design flood";  $c = 0.35$  opening coefficient square; there is an unobstructed rectangular shape between the louvers);  $R = 5 \text{ ft/hr}$  maximum case rate of rise and fall; and  $A_e$  = total enclosed area.

$$A^o/A_e = 0.033[1/C]R = 0.033[1/0.40]5 = 0.4125 \text{ in}^2 \text{ per ft}^2 \text{ enclosed area}$$

$$\text{Example: D0816:} = 95 \text{ in}^2 / 0.4125 \text{ in}^2 \text{ per ft}^2 = 230 \text{ ft}^2$$

Model #	Size (HXW)	Non-Engineered (Sq. Inches)	Net-Free Air (Sq. Inches)	Enclosed Area (Sq. ft)
D0816	8" x 16"	128	95	230
D1220	12" x 20"	240	175	424
D1232	12" x 32"	384	290	703
D1616	16" x 16"	256	200	423
D1624	16" x 24"	384	285	691
D1632	16" x 32"	512	385	933
D2032	20" x 32"	640	505	1,224
D2424	24" x 24"	576	435	922
D2436	24" x 36"	864	665	1,612

## Installation Limitations and Instructions

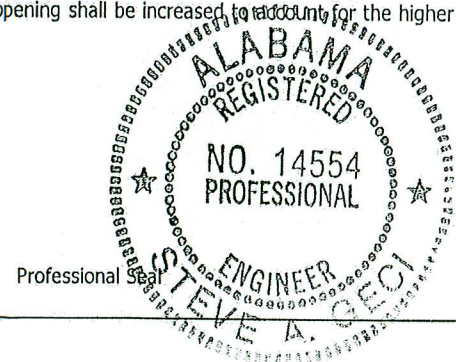
Each individual opening, and any louvers, screens, or other covers, shall be designed to allow automatic entry and exit of floodwaters during design flood or lesser flood conditions; there shall be a minimum of two openings on different sides of each enclosed area; if a structure has more than one enclosed area below the DFE, each area shall have openings; openings shall not be less than 3 inches in any direction in the plane of the wall; the bottom of each required opening shall be no more than 1 ft above the adjacent ground level; the difference between the exterior and interior floodwater levels shall not exceed 1 ft during base flood conditions; in the absence of reliable data on the rates of rise and fall, assume a minimum rate of rise and fall of 5 ft/h; where data or analysis indicates more rapid rates of rise and fall, the total net area of the required opening shall be increased to account for the higher rates of rise and fall.

Signature: Steve Geci 6/30/10

Title: Steve Geci, Pres. Geci & Associates Engineers, Inc.  
2950 N 12<sup>th</sup> Avenue, Pensacola, FL 32503

Type of License: PE

Alabama License Number: 14554





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Signature: [Signature] 6/30/10

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Type of License: PE

Florida License Number: 33658

